## **CLAIMS**

What is claimed is:

	1	1. A method comprising:
	2	re-compiling a function when a field watch for a field is activated, the
	3	function including a byte code sequence having a field byte code that accesses or
	4	modifies the field, the recompiled function providing a native code and occupying
	5	a code space;
		• /
	6	generating an instrumentation code corresponding to the field watch of the
	7	field; and
	8	inserting the instrumentation code to the native code.
	_	
	1	2. The method of claim 1 further comprising:
	2	guarding execution of the instrument time 1 201 C 11
	3	guarding execution of the instrumentation code if the field watch is not activated.
	3	activated.
	1	3. The method of claim 1 wherein generating the instrumentation
	2	The method of claim? Wherein generating the instrumentation
	_	code comprises:
	3	executing a field watch sequence if the field watch is activated.
		a nation ocquoned if the field water is activated.
	1	4. The method of claim 1 wherein executing the field watch sequence
	2	comprises:
•	_	comprises.

3	saving live global state, the live global state corresponding to an active
4	register;
5 6	executing an event hook function for an event corresponding to the field watch; and
7	restoring the live global state.
1 2	5. The method of claim 4 wherein saving the live global state comprises:
3	pushing the live global state onto a stack.
1 2	6. The method of claim 4 wherein executing the event hook function comprises:
3	passing an argument corresponding to the field; and
4	calling a run-time library function related to the event.
1 2	7. The method of claim 5 wherein restoring the live global state comprises:
3	retrieving the live global state from the stack.
1 2	8. The method of claim 1 wherein inserting the instrumentation code comprises:
3	inserting the instrumentation code in a stub at end of the code space

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1	9. The method of claim 2 wherein guarding execution of the
2	instrumentation code comprises:
3	updating an offset of a jump instruction to the stub when the field watch is
4	activated.
1	10. The method of claim 1 wherein guarding execution of the
2	instrumentation code comprises:
_	instrumentation code comprises.
3	replacing a no-op sequence with a jump instruction to the stub.
1	11. The method of claim 9 further comprising:
2	clearing the field watch by replacing the offset with a zero offset.
1	12. The method of claim 10 further comprising:
2	clearing the field watch by replacing the jump instruction with the no-op
3	sequence.
1	13. The method of claim 1 wherein the function is a Java method.
1	14. The method of claim 1 wherein the field is a Java field in a Java
2	virtual machine.
1	15. The method of claim 4 wherein the event hook function is
2	compatible with a Java Virtual Machine Debug Interface (JVMDI).

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1	<ol><li>A computer program product comprising:</li></ol>
2	a machine useable medium having computer program code embedded
3	therein, the computer program product having:
4	computer readable program code to re-compile a function when a
5	field watch for a field is activated, the function including a byte code
6	sequence having a field byte code that accesses or modifies the field, the
7	recompiled function providing a native code and occupying a code space,
8	computer readable program code to generate an instrumentation
9	code corresponding to the field watch of the field, and
10	computer readable program code to insert the instrumentation code
11	to the native code.
1	17. The computer program product of claim 16 further comprising:
2	computer readable program code to guard execution of the instrumentation
3	code if the field watch is not activated.
1	18. The computer program product of claim 16 wherein the computer
2	readable program code to generate the instrumentation code comprises:
	1 3 section and mentaline route comprises.
3	computer readable program code to execute a field watch sequence if the
4	field watch is activated.

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readable program code to execute a field watch sequence comprises:

The computer program product of claim 16 wherein the computer

3 4	computer readable program code to save live global state, the live global state corresponding to an active register;
5 6	computer readable program code to execute an event hook function for an event corresponding to the field watch; and
7	computer readable program code to restore the live global state.
1 2	20. The computer program product of claim 19 wherein the computer
4	readable program code to save the live global state comprises:
3	computer readable program code to push the live global state onto a stack.
1 2	21. The computer program product of claim 19 wherein the computer readable program code to execute the event hook function comprises:
3 4	computer readable program code to pass an argument corresponding to the field; and
5 6	computer readable program code to call a run-time library function related to the event.
1 2	22. The computer program product of claim 20 wherein the computer readable program code to restore the live global state comprises:
3 4	computer readable program code to retrieve the live global state from the stack. $% \frac{\partial f}{\partial x} = \frac{\partial f}{\partial x} + \frac$

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readable program code to insert the instrumentation code comprises:

The computer program product of claim 16 wherein the computer

3	computer readable program code to insert the instrumentation code in a
4	stub at end of the code space.
	stab at the of the code space.
1	24. The computer program product of claim 16 wherein the computer
2	readable program code to guard execution of the instrumentation code comprises
	r0
3	computer readable program code to update an offset of a jump instruction
4	to the stub when the field watch is activated.
1	25. The computer program product of claim 16 wherein the computer
2	readable program code to guard execution of the instrumentation code comprises
3	computer readable program code to replace a no-op sequence with a jump
4	instruction to the stub.
•	and and the state.
1	26. The computer program product of claim 24 further comprising:
2	computer readable program code to clear the field watch by replacing the
3	offset with a zero offset.
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1	27. The computer program product of claim 25 further comprising:
2	computer readable program code to clear the field watch by replacing the
3	jump instruction with the no-op sequence.
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a Java method.

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The computer program product of claim 16 wherein the function is

1	29. The computer program product of claim 16 wherein the field is a
2	Java field in a Java virtual machine.
1	30. The computer program product of claim 19 wherein the event hook
2	function is compatible with a Java Virtual Machine Debug Interface (JVMDI).
1	31. A system comprising:
2	a processor;
3	a memory coupled to the processor to store instruction code, the
4	instruction code, when executed by the processor, causing the processor to:
5	re-compile a function when a field watch for a field is activated,
6	the function including a byte code sequence having a field byte
7	code that accesses or modifies the field, the re-compiled function
8	•
8	providing a native code and occupying a code space,
9	generate an instrumentation code corresponding to the field watch
10	of the field, and
11	insert the instrumentation code to the native code.
1	32. The system of claim 31 the instruction code further causing the
2	processor to:
-	F
3	guard execution of the instrumentation code if the field watch is not
4	activated.

1	33. The system of claim 31 wherein the instruction code causing the
2	processor to generate the instrumentation code causes the processor to:
3	execute a field watch sequence if the field watch is activated.
1	34. The system of claim 31 wherein the instruction code causing the
2	processor to execute a field watch sequence causes the processor to:
3	save live global state, the live global state corresponding to an active
4	register;
5	execute an event hook function for an event corresponding to the field
6	watch; and
7	restore the live global state.
1	35. The system of claim 32 wherein the instruction code causing the
2	processor to guard execution of the instrumentation code causes the processor to:
3	update an offset of a jump instruction to the stub when the field watch is
4	activated.
1	36. The system of claim 32 wherein the instruction code causing the
2	processor to guard execution of the instrumentation code causes the processor to:
3	replace a no-op sequence with a jump instruction to the stub.

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The system of claim 31 wherein the function is a Java method.

- 1 38. The system of claim 31 wherein the field is a Java field in a Java
- 2 virtual machine.
- 1 39. The system of claim 34 wherein the event hook function is
- 2 compatible with a Java Virtual Machine Debug Interface (JVMDI).